Cells and Heredity

7-2 The student will demonstrate an understanding of the structure and function of cells, cellular respiration, and heredity. (Life Science)

7.2.2 Compare the major components of plant and animal cells.
Taxonomy level: 2.6-B Understand Conceptual Knowledge

Previous/Future knowledge: In 5th grade (5-2.1), students recalled that the smallest unit of life was the cell and identified its major structures (including cell membrane, cytoplasm, nucleus, and vacuole). In 6th grade students learned about plants and animals but not their cells. Students have not studied the major differences between plants and animals at the cellular level. More detail of cell structures and processes will be a part of high school biology classes.

It is essential for students to know that even though all living organisms are made of cells that contain similar structures, there are differences between the structures of the cells of plants and animals.

- Structures that are common to plant and animal cells are the cell membrane, nucleus, mitochondria, and vacuoles.
- Structures that are specific to plants are the cell wall and chloroplasts.

Major structural differences between a plant and an animal cell include:

- Plant cells have a cell wall, but animal cells do not. Cell walls provide support and give shape to plants.
- Plant cells have chloroplasts, but animal cells do not. Chloroplasts enable plants to perform photosynthesis to make food.
- Plant cells usually have one or more large vacuole(s), while animal cells have smaller vacuoles, if any are present. Large vacuoles help provide shape and allow the plant to store water and food for future use. The storage function plays a lesser role in animal cells, therefore the vacuoles are smaller.

It is not essential for students to know other organelles in plant and animal cells or to know the chemical processes that occur within the cell parts.

Assessment Guidelines:
The objective of this indicator is to *compare* the major components of plant and animal cells; therefore, the primary focus of assessment should be to detect how the plant and animal cells structures are similar and different. However, appropriate assessments should also require students to *identify* the component parts of plant and animal cells; *exemplify* cell parts that perform specific functions in either plant or animal cells; *illustrate* plant and animal cells to indicate cell structures in each type of cell using pictures, words, or diagrams; or *classify* cells as either plant or animal based on their cell parts.